

# Factors Impacting Undergraduate Hispanic Students' Retention in Construction Programs: A Mixed Methods Research Synthesis

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Hispanic workers play a central role in the United States (US) construction industry and have a remarkable impact on US construction activities. But they still lag behind other population groups in obtaining bachelor's degrees. In an effort to grow the number of Hispanic construction managers, there should first be a growth in Hispanics earning construction science degrees. Many Hispanic students who begin postsecondary education simply do not graduate, and their college completion rate remains low. Construction education in particular has a problem retaining Hispanic students who could be the future professionals meeting this challenge. The purpose of this study was to identify the factors contributing to the retention of Hispanic students in construction science education. A mixed methods research synthesis (MMRS) was employed to analyze a body of empirical articles reporting on the factors impacting Hispanic student retention in construction education. The literature revealed different factors including financial aid, construction-related student organizations, tutorial services, academic advising, career development programs, academic workshops, construction-oriented learning communities, undergraduate research experience, extracurricular activities, mentoring programs, Hispanic faculty members in the construction program, and Hispanic peers and students in the construction program.

**Key Words:** Hispanic Students, Retention, Construction Education, Mixed Methods Research Synthesis

## Introduction

Hispanic workers play a central role in the United States (US) construction industry and have a substantial impact on US construction activities. As of 2017, Hispanic workers constitute 29.8% (almost 3.2 million) of the US construction industry workforce—the largest percentage of any ethnic group in the construction industry (Bureau of Labor Statistics [BLS], 2017). But they still lag behind other population groups in obtaining bachelor's degrees: only 6.9% of Hispanics in the construction industry have a bachelor's degree or higher, and 46% of them have less than a high-school diploma (Center for Construction Research and Training [CPWR] Data Center, 2018). While Hispanics account for more than 45.5% of construction laborers, only about 11% of construction managers are Hispanic (BLS, 2016b), which can be attributed to the fact that they are underrepresented in management positions in construction careers.

### *Call for Hispanic Construction Managers*

While effective communication is critical for the successful implementation of any construction project (Escamilla et al., 2018), it is a major problem in construction occupations. A study of 97 Hispanic construction craft workers on heavy/highway and commercial projects in Iowa reported that 55% of workers identify a lack of communication as the main obstacle on the job site (Canales et al., 2009). In addition, Dong et al. (2013), by analyzing nationally representative data from the 2008 Survey of Income and Program Participation, found that “more than 80% of Hispanic construction workers did not speak English at home and 37% of Hispanic construction workers did not speak English very well or did not speak English at all.” As of 2015, according to CPWR (The Center for Construction Research and Training) (2018), about 30% of construction workers speak a language other than English at home

(nearly 86% of foreign-born construction workers report speaking Spanish at home). Failure to communicate effectively decreases the safety and productivity of construction workers (Escamilla et al., 2017).

Understanding cultural differences is just as crucial as communication (National Association of Home Builders [NAHB] Now, 2015). Hofstede (1991) defined culture as “the collective programming of the mind, which distinguishes the members of one group or category of people from another” (p. 5). Brunette (2004) stated that once Hispanic workers immigrate to the US, they “bring with them varied histories, cultural sensibilities, strong health beliefs, and a different cultural background in comparison with non-Hispanic workers” (p. 246). Mismanaging cultural diversity can result in lower morale, lower productivity, and higher accident rates (Loosemore & Lee 2002). In order to overcome language and cultural barriers, there is a call for bilingual and bicultural construction managers for foreman and supervisory roles in the construction industry.

In an effort to grow the number of Hispanic construction managers in the U.S. market, there should first be a growth in Hispanics earning construction science degrees (Escamilla et al., 2016, Escamilla & Ostadalimakhmalbaf, 2016). Many Hispanic students who begin postsecondary education simply do not graduate, and their college completion rate remains low (Lumina Foundation, 2011; Pyne & Means, 2013). The problem of this research is that construction education in particular has a problem retaining Hispanic students who could be the future professionals meeting this challenge (Escamilla et al., 2018, Bigelow et al., 2016). While the main reasons for the low retention rate of Hispanic students should be investigated, this research focuses instead on what retention strategies are influential to assist construction science programs in enhancing Hispanic student success.

The purpose of this paper was to identify the factors contributing to the retention of Hispanic students in construction education programs. In other words, this study critically investigated the impact of retention factors on Hispanic students in their undergraduate construction education. Specifically, this study investigated the following question: What is known about the factors helping to retain Hispanic students in construction education programs?

## Methodology

A mixed methods research synthesis (MMRS) (Sandelowski, Barroso, & Voils, 2007; Heyvaert, Maes, & Onghena, 2013) was employed to analyze a body of articles reporting on the factors impacting the retention of Hispanic students in construction education. Sandelowski et al. (2012) defined MMRS as “a form of systematic literature review in which the findings of completed empirical qualitative and quantitative observational and experimental studies are integrated using qualitative and quantitative methods” (p. 316). MMRS investigates data collected, analyzed, and interpreted in qualitative, quantitative, and primary-level mixed studies (Heyvaert, Maes, & Onghena, 2013). By employing MMRS “- compared to ‘unmixed’ syntheses- more complete, concrete, and nuanced answers can be given to complex research questions” (Heyvaert, Maes, & Onghena, 2013, p. 671). In MMRS, analysis includes organizing, summarizing, and categorizing data in a form that computes the equivalent of an effect size (Simmons, Creamer, & Yu, 2017).

### *Data Collection*

This study adopted a four-step process for data collection modeled by Borrego et al. (2014) to ensure that data represented the posed research questions. The four steps involved are as follows: (1) define the research question, (2) define the scope of inquiry, (3) find sources, and (4) apply appropriate exclusion criteria (Fig. 1) (Hurwitz et al., 2016).

*Step 1: Defining the Research Question:* This work aimed to answer the following research question: What factors contribute to increasing Hispanic student retention in construction education?

*Step 2&3: Defining the Scope of Inquiry and Finding Sources:* Peer-reviewed research papers published after 2000 were extracted from various databases such as ProQuest Dissertations and Theses, Web of Science, Google Scholar, Scopus, and Engineering Village. Articles in peer-reviewed journals and conference papers

constitute a primary source of reviewed information. To narrow the scope of search results, articles in the literature review were chosen based on the following criteria: Language, Text availability, Article type, and Publication date. Additionally, technical reports from famous effective local and national research institutes, government documents, and other literary sources were also gathered to obtain a holistic literature review. Search terms used in search engines included the following: Hispanic students in construction, Hispanic student retention, Hispanic student persistence, Hispanics in construction education, Hispanic student success, and Hispanic student education.

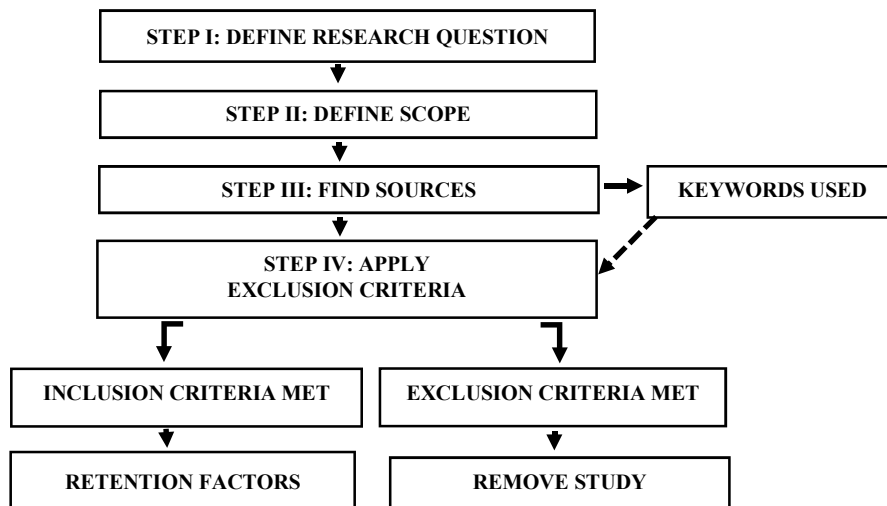


Fig. 1. Flowchart of systematic literature review process (adopted from Hurwitz et al., 2016).

*Step 4: Applying Appropriate Exclusion Criteria:* Inclusion and exclusion criteria were developed by accounting for the research questions. In particular, the focus was on the retention of Hispanic students in higher education. As a result, articles focusing on following areas were excluded: Kindergarten (K) to 12 education, Informal education, Professional development, and Ethnicities other than Hispanic.

Eventually, 32 articles were identified—18 quantitative studies, 12 qualitative studies, and 2 mixed methods studies (Table 1)

Table 1. Article descriptions

#	Author(s)	Year	Research Method	Summary of Retention Factor(s)
1	Backer & Kato	2017	Quantitative	Academic advising, student learning communities, peer mentoring
2	Fleming	2016	Quantitative	Tutoring, research experience, and industry internships
3	Lopez	2016	Qualitative (interviews)	Hire more Latino faculty and staff, Peer mentoring (Latino student mentors), financial aid and scholarships
4	Contreras & Contreras	2015	Quantitative	Increase Latino faculty in Hispanic-serving institutions (HSIs), increase Latino administrators in HSIs
5	Enriquez et al.	2015	Quantitative	Undergraduate research experience (team work, technical report, poster presentation, oral presentation)
6	Krause et al.	2015	Quantitative	Undergraduate initiative, Professional societies, Learning assistants (peer mentors)
7	Biswas et al.	2015	Quantitative	Workshop (field trip; discussions with industry representatives)
8	Núñez	2014	Qualitative	Engaging scholarship with communities (participating in service-learning activities)

9	Salas et al.	2014	Qualitative (interviews)	Mentoring program that provided them with networking, and interacting with other Latina/o students
10	Escamilla & Trevino	2014	Qualitative	supporting and counseling students with planning their budget toward completion of their degree
11	Gonzalez & Pinzon	2014	Quantitative	Academic workshop (regional field trip, guest speaker lectures)
12	Bouniaev et al.	2014	Quantitative	student meetings, professional services and seminars, mentoring networks, cohort mentors,
13	Capri et al.	2013	Qualitative	Academic advising, peer-mentoring, math/science resource center, career development, research symposium
14	Musoba et al.	2013	Qualitative (interviews)	career exploration and planning, someone to guide the students through the process)
15	Martin et al.	2013	Qualitative (interviews)	Peer-mentoring, academic advising, funding or space for student organizations, student study groups, social- and cultural-related student organization, scholarship
16	Kukreti et al.	2013	Quantitative	academic monitoring program; service learning activity; industry-mentoring program; Research program
17	Enriquez et al.	2013	Quantitative	Research internship program
18	Montalvo	2012	Mixed Methods	Economic capital (federal grant aid, state/local grant aid, student loan aid), social and cultural capital
19	Marosi & Steinhurst	2012	Qualitative	Industry advisory committee (raising funds to endow the program, interacting with mentor students, field trip to the headquarters and job site, professional development)
20	Abood et al.	2012	Qualitative (interviews)	scholarship, recruit Hispanic faculty, student advisory, events/foods/lectures that relate to the Latino culture
21	Sandoval et al.	2011	Mixed Methods	counsels/advises individuals; paid-for tuition and fees; partial book assistance
22	Arana et al.	2011	Qualitative (interviews)	Faculty and university support; events cater to Mexican-American culture, history, music, and dance)
23	Jones et al.	2011	Quantitative	Mentoring (coordinated workshops with mentors and protégés, career planning); Financial support
24	Crisp & Nora	2010	Quantitative	Receipt of financial support
25	Cejda & Hoover	2010	Qualitative (interviews)	Learning community within the classroom; develop personal relationships with students
26	Cerna et al.	2009	Quantitative	Socioial Capital (student protests, community service–related work, religious activities); financial assistance; Increased number of Latina/os enrolled on campus and Latina/o peers on campus
27	Crown et al.	2009	Quantitative	Monitoring and academic advising of students (proposed workload and reasonable progress toward graduation) Mentoring students,
28	Serrata	2009	Qualitative (interviews)	Financial aid/financial aid process (emergency loans)
29	Torres & Hernandez	2009	Quantitative	Advising Programs; mentoring programs
30	Maestas et al.	2007	Quantitative	Having classes with peer discussions/interactions, Social integration (joining a sorority or fraternity)
31	Davis et al.	2007	Quantitative method	Electronic mentoring (encouragement and career counseling, and other life skills)
32	Cantu	2004	Quantitative method	Academic and career counseling and mentoring, Financial aid, internship programs, peer mentor programs, Hispanic student organizations and clubs, learning communities,

## Findings and Data Analysis

### *Inductive analysis*

The different retention initiatives positively impacting Hispanic students were analyzed inductively using the extracted information. Initial line-by-line coding (or free coding) was conducted to develop specific codes (e.g., fellowship, industry mentoring, degree evaluation, etc.). Then, 125 initial codes were sorted as out-of-class involvement influences on student development. Initial codes were organized into 12 categories of retention factors, employing a higher level of abstraction. For instance, the initial codes related to career fairs and internships were grouped into the *Career development program* category (Table 2). “This process required decisions about what categories made the most analytic sense to organize the initial codes inclusively and completely” (Simmons, Creamer, & Yu, 2017, p.11). The literature reviewed proposed 12 retention factors: Financial aid, Construction-related student organizations, Tutorial services, Academic advising, Career development programs, Academic workshops, Construction-oriented learning communities, Undergraduate research experience, Extracurricular activities, Mentoring programs, Hispanic faculty members in the construction program, and Hispanic peers and students in the construction program.

**Table 2—Retention Factors Impacting Hispanic Students**

#	Retention Factor	Description of Factor
1	Financial aid	Refers to scholarship, fellowship, support for tuition, books, and fees
2	Construction-related student organizations	Refers to funding or space for students organizations such as Associated Builders and Contractors (ABC), Associated General Contractors (AGC), NAHB, Construction Managers Association of America (CMAA)
3	Tutorial services	Refers to services such as math and science resource center and writing center
4	Academic advising	Refers to proposed course workload and reasonable progress toward graduation, evaluation of grades, course prerequisites, graduation requirements, transfer credits, university requirements, and early warnings
5	Career development programs	Refers to career counseling, assisting students in expanding their vocational aspirations, industry internships, and career planning
6	Academic workshops	Refers to participation in professional conferences, competitions, workshops, regional field trip, and guest speaker lectures
7	Construction-oriented learning communities	Refers to participation in service-learning activities, engagement of students with their courses outside of the classroom, community service learning, and student learning communities
8	Undergraduate research experience	Refers to participation in research symposium, undergraduate research course credit, writing a technical report, creating a poster presentation, making an oral presentation
9	Extracurricular activities	Refers to participation in social- and cultural-related organizations and activities such as sorority, fraternity, student protest, religious activity, and event catering to Hispanic culture/history/music/dance
10	Mentoring programs	Refers to peer mentoring, industry mentoring, coordinated workshops with the mentors and protégés, the opportunity to be matched with working professionals, and development of professionals skills
11	Hispanic faculty in construction program	Refers to recruiting Hispanic faculty and staff and hiring more Latino faculty and staff
12	Hispanic students in construction program	Refer to an increased number of Latina/os enrolled on a campus and an increased number of Latina/o peers on campus

### *Frequency calculation*

The frequency of each retention factor was analyzed by counting the number of articles that reported various categories of factors (Table 3).

**Table 3—Frequency Calculation**

<b>Retention Initiative Category</b>	<b>Frequency</b>	<b>Percentage</b>	<b>Rank</b>
Mentoring programs	15	45.45%	<b>1</b>
Academic advising	12	36.36%	<b>2</b>
Financial aid	11	33.33%	<b>3</b>
Construction-oriented learning communities	9	27.27%	<b>4</b>
Extracurricular activities	8	24.24%	<b>5</b>
Undergraduate research experience	7	21.21%	<b>6</b>
Career development programs	7	21.21%	<b>6</b>
Hispanic faculty members	6	18.18%	<b>8</b>
Academic workshops	3	9.09%	<b>9</b>
Tutorial services	2	6.06%	<b>10</b>
Hispanic peers and students in the construction program	2	6.06%	<b>10</b>
Construction-related student organizations	1	3.03%	<b>12</b>

As it is presented in table 2, “Mentoring programs,” “Academic advising,” and “Financial aid” were found as the top most important factors impacting retention of undergraduate Hispanic students in construction programs. In addition, “Tutorial services,” “Hispanic peers and students in the construction program,” and “Construction-related student organizations” were found as the least important factor on the list.

### **Conclusion**

This study employed MMRS to analyze a body of empirical articles reporting on the factors impacting the retention of Hispanic students in higher education. While the majority of the literature findings mainly came from Hispanics in engineering programs, there is still a question which one of the retention factors are specifically most influential in improving Hispanic students’ retention in undergraduate construction programs. For instance, while undergraduate research activities were among the six most important retention factors reported by the literature, this factor is limited in construction education. As a result, the next phase of this study will employ Delphi method on two levels to identify which factors have the strongest effect to assist undergraduate construction programs in determining where best to focus retention strategies to enhance Hispanic student success. The levels will include:

- Academic level: consisting of academic experts in the area of construction education or Hispanics in construction education
- Construction industry level: consisting of professionals working in the construction industry who graduated with an undergraduate degree in construction education

Research in the area of Hispanics in construction education is limited. This study can serve as a basis for future research in Hispanic students’ retention.

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